

CLAIMS

What is claimed is:

1. A transfer unit of an electrophotographic image forming apparatus having a plurality of photosensitive drums, the transfer unit comprising:
 - a transfer belt which has a closed shape, is rotated while contacting the photosensitive drums, onto which toner images formed on the photosensitive drums are transferred, and which transfers the toner images onto a paper;
 - a plurality of main frames;
 - a driving assembly having:
 - a driving roller which is installed inside of the transfer belt to be supported by the plurality of main frames and rotates and drives the transfer belt, and
 - a steering roller portion which is installed inside of the transfer belt to be supported by the plurality of main frames and to push the transfer belt from the inside thereof to tighten the transfer belt;
 - a plurality of auxiliary frames;
 - a transfer backup roller assembly having:
 - a plurality of transfer backup rollers which are installed inside of the transfer belt to be opposite to the photosensitive drums, the transfer belt being between the transfer backup rollers and the photosensitive drums and supported by the plurality of auxiliary frames and to support the transfer belt so that the toner images formed on the photosensitive drums are transferred onto the transfer belt, and
 - a plurality of guide rollers which are inside of the transfer belt to be supported by the plurality of auxiliary frames and guide the transfer belt; and
 - a transfer backup roller ascending and descending portion which ascends and descends the transfer backup roller assembly towards and away from the driving assembly.

2. The transfer unit of claim 1, wherein the transfer backup roller ascending and descending portion comprises:

a support shaft which is inserted into perforations in the auxiliary frames and is supported by the main frames;

an ascending and descending member having an ascending and descending protrusion which is installed at a first side of the support shaft, to contact the auxiliary frames as the support shaft is pivoted, and ascends and descends the transfer backup roller assembly towards and from the driving assembly; and

a pivoting member which is installed at a second side of the support shaft opposite the first side of the support shaft and pivots the support shaft.

3. The transfer unit of claim 2, further comprising:

an ascending and descending hole formed in one of the auxiliary frames; and

a support jaw to ascend the transfer backup roller assembly towards the driving assembly while the ascending and descending member is rotated.

4. The transfer unit of claim 2, further comprising:

a plurality of transfer backup roller fixing portions in which the transfer backup rollers are respectively rotatably supported, each of the transfer backup roller fixing portions including :

a fixing member which is fixed in the respective auxiliary frame and including an electrode plate to which current is supplied,

a receiving member having a hook which is installed to be slid in the fixing member and on which one end of the respective transfer backup roller is seated,

an elastic member which elastically biases the receiving member to be detached from the fixing member, and

a detachment prevention member which is combined with the hook, provided in the fixing member and to prevent the respective transfer backup roller from detaching from the receiving member due to an elastic force of the elastic member.

5. The transfer unit of claim 4, wherein the receiving members each include:
a receiving part on which the respective transfer backup roller is seated, and
a protrusion connected to the respective elastic member.

6. The transfer unit of claim 5, wherein the electrode plates are inserted in fixing protrusions respectively formed in the fixing members.

7. The transfer unit of claim 6, wherein the elastic members are placed between the fixing protrusions and the protrusions of the receiving members.

8. The transfer unit of claim 4, wherein the elastic members and the receiving members are made of a conductive material.

9. The transfer unit of claim 4, wherein each of the electrode plates is made of a conductor and each of the electrode plates receives a same bias so that a current is supplied to each of the transfer backup rollers.

10. The transfer unit of claim 1, further comprising a base having a sliding portion within the main frames, wherein the steering roller portion comprises:
a steering roller which is rotatably installed in the main frames;
a plurality of support parts respectively installed at first and second sides of the steering roller;

a press roller which is installed in the support parts and is elastically biased by the sliding portion; and

a tension roller which is installed in the support parts, to contact an inside of the transfer belt, and tighten the transfer belt.

11. The transfer unit of claim 10, wherein the sliding portion comprises:

a plurality of stoppers installed in the base;

a slider in which a sliding hole to be inserted in the stoppers and slid is formed, an end thereof to contact the press roller; and

a fixing part at one side of the slider;

an elastic member, which is installed in the fixing part to elastically bias the slider towards the press roller.

12. The transfer unit of claim 1, further comprising a transfer roller which is installed opposite to the driving roller, wherein the transfer belt is placed therebetween, and the transfer roller transfers the images from the transfer belt onto the paper.

13. The transfer unit of claim 1, further comprising a plurality of position fixing pins which are inserted into perforations in the auxiliary frames, are supported by the main frames, and support the transfer backup roller assembly.

14. The transfer unit of claim 13, further comprising a plurality of support holes formed in the auxiliary frames, to prevent the position fixing pins from contacting the auxiliary frames so that an ascending and descending operation of the transfer backup roller assembly is not disturbed.

15. The transfer unit of claim 11, wherein the elastic member is a spring.
16. The transfer unit of claim 14, wherein the support holes have a length larger than an ascending and descending distance of the transfer backup roller assembly.
17. The transfer unit of claim 14, wherein the support holes have a length larger than a diameter of the position fixing pins.
18. The transfer unit of claim 1, further comprising:
 - a plurality of position fixing protrusions respectively formed in the main frames; and
 - a plurality of position fixing holes corresponding to the position fixing protrusions and respectively formed in the auxiliary frames, wherein
 - the position fixing protrusions are inserted in the position fixing holes when the transfer backup roller assembly is descended by the transfer backup roller assembly ascending and descending portion.
19. An apparatus, comprising:
 - a plurality of photosensitive drums;
 - a transfer belt to receive images from the photosensitive drums; and
 - a transfer unit to transfer the images from the photosensitive drums to the transfer belt, comprising:
 - a plurality of first frames,
 - a transfer backup roller assembly including:
 - a plurality of transfer backup rollers respectively opposite the photosensitive drums, and
 - a transfer backup roller moving portion which moves the transfer backup

rollers towards or away from the photosensitive drums.

20. The apparatus of claim 19, further comprising:

a plurality of second frames;

a driving roller supported by the second frames to drive the transfer belt; and

a steering roller supported by the second frames to tighten the transfer belt.

21. The apparatus of claim 19, further comprising:

a plurality of guide rollers supported by the plurality of first frames to guide the transfer belt.

22. The apparatus of claim 19, wherein the transfer backup roller moving portion moves all of the transfer backup rollers towards or away from the photosensitive drums at the same time.

23. An apparatus, comprising:

a plurality of photosensitive drums;

a transfer belt to receive images from the photosensitive drums; and

a transfer unit to transfer the images from the photosensitive drums to the transfer belt, comprising:

a plurality of transfer backup rollers respectively opposite the photosensitive drums, and

a transfer backup roller moving portion which moves all of the transfer backup rollers towards or away from the photosensitive drums at the same time.